SCIENCE & GOVERNMENT REPORT

21st Year of Publication

The Independent Bulletin of Science Policy

Volume XXI, No. 13 | P. O. Box 6226A, Washington, D. C. 20015 | © August 1, 1991

"Science Is Going to Get Screwed"

Candor and Clashes Mark Hearing on R&D Priorities

NASA's leading political brawler, J.R. Thompson, Deputy head of the space agency, pugnaciously insisted that the Space Station budget would not impinge on space science. The budget is "balanced" among NASA's programs, he declared to skeptical Congressmen.

"I don't understand what the hell your definition is of balanced," Leon Panetta (D-Calif.), Chairman of the House Budget Committee, snapped at him.

Thompson stood firm, arguing that the prominence of the Space Station "doesn't mean that science isn't perhaps even *first* among equals."

"But science is going to get screwed in that process," Panetta said.

Not even feigning the deference that witnesses customarily bestow on Congressional chieftains, Thompson slowly growled:

"Science has not been screwed in NASA for a long time, and it won't for a long time to come."

The exchanges were in tune with a remarkable four hours of acrid repartee on July 11 before a new participant in science-policy deliberations, the House Budget Committee Task Force on Defense, Foreign Policy, and Space. The topic was "Establishing Priorities in Science Funding." The subject fascinates legislators and alarms the managers of federal research programs, particularly those responsible for the two mega-projects on the Task Force griddle, the Space Station and the Superconducting Super Collider (SSC). What ensued was a forensic brawl in which mega-project foes and proponents delivered accusations of lies, deceptions, and ignorance.

The hearing opened with an unusual departure from legislative decorum, an acrimonious exchange between a Congressman appearing as a witness, normally an occasion for effusive politesse, and members of the hearing committee. In this instance, the Congressman-witness was Rep. George Brown (D-Calif.), Chairman of the Science, Space, and Technology Committee, a bastion of enthusiastic support for the Space Station and the SSC. Brown, age 71 and in his 26th year in Congress, ascended to the Science Chairmanship this year. A dedicated, outspoken supporter of research, he clearly relishes the post as a long-sought cap to his career.

Presiding at the hearing was Budget Task Force Chairman Dick Durbin (D-Ill.), seething with skepticism about the realism of budget plans for both big-science ventures. Join-

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Dingell on the Warpath

NIH Director Defends Curbs On Misconduct Office

The honeymoon for the new Director of the National Institutes of Health, Bernadine Healy, ended with a crash on August 1 as Congressmen accused her of crippling the NIH Office of Scientific Integrity (OSI).

Healy, alternating between anger and scorn, sharply disputed insinuations that she had bashed OSI because of its criticisms of her handling of a misconduct case while she was head of research at the Cleveland Clinic.

The encounter with the NIH Director took place at a hearing called by Rep. John Dingell (D-Mich.), Chairman of the House Energy and Commerce Oversight and Investi-

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In Brief

Dwindling hopes for an R&D "peace dividend" have been revived by reports of a deal to shift $480 million in Pentagon funds to NASA programs crimped by the Space Station and also to make up for Congressional reductions in NSF's Antarctic program. First reported in the *Wall Street Journal*, the transfers are technically in violation of last year's White House-Congressional summit pact. Under that agreement, the referee is OMB Director Richard Darman, a space and science booster.

Upheavals in NSF's Division of Science Resources Studies [SGR July 1] have taken a toll on several annual publications produced by SRS, including National Patterns of R&D Resources *and* Federal R&D Funding by Budget Function, *both cancelled for 1991. The biennial* Science & Engineering Indicators, *a major compendium of R&D data due for submission to the President by January 15, is on a tight schedule, NSF sources tell SGR.*

Included on a list of 74 NASA "spinoffs" hailed by Senator Howell Heflin (D-Ala.) July 17 during debate on the NASA appropriation: "Smoke detector," "Computerized beauty makeover," "Technology for Portable Ice Rinks," "Robotic sow, artificial nursing machine for piglets," "Footwear spinoffs from the moon boots," and "How various chemical structures hold up when used in plastic containers." The source of the list, NASA's Office of Commercial Programs, defines a "spinoff" as NASA technology "applied to another purpose."

Formation of a Congressional Biotechnology Caucus was announced July 17 by its founding members: Senators Frank Lautenberg (D-NJ) and Hank Brown (R-Col.) and Reps. Tom McMillen (D-Md.) and Tom Bliley (R-Va.).

. . . Brown Says NASA Foes Just Want to Defy Bush

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ing in was Budget Committee Chairman Panetta. The Budget Committee cannot cut or expand the budget, but it possesses authority to review spending plans and produce analyses and recommendations. In the workings of the House, the Committee is not dominant on budget matters, but it is influential. At the outset, Durbin explained that the hearing was called because of concerns about the growing share of R&D funds devoted to mega-projects.

"The President's proposed spending increases for the Supercollider and the Space Station," Durbin said, "represent 50 percent of all new domestic discretionary spending in fiscal 1994." Add in NASA's Earth Observation System, he continued, and the figure rises to 90 percent.

Brown responded with a boiler-plate paean to the Space Station as an investment in industrial competitiveness, while pointing out that because of budget shortfalls and "Congressionally mandated redesigns, many features [of the Station] that would be good for science have been deferred."

Turning to the SSC, he protested its depiction as "big science." Rather, Brown insisted, "It is thousands of small projects, in numerous scientific fields," conducted at scores of universities and other research centers. And though the human genome project was not on the Task Force agenda, Brown offered a defense of that, too, describing it as "nothing but a massive collection of small science projects." Brown also suggested a formula for financing growth in space and other fields of research: Redeployment of military R&D programs into civilian R&D.

Science Chairman Brown, sharing the witness table with his Space Subcommittee Chairman, Rep. Ralph M. Hall (D-Tex.), then proceeded into a rhetorical fire fight with Task Force Chairman Durbin and Chairman Panetta of the full Budget Committee.

"At what price the space station?" Panetta asked, adding, "Is the space station going to basically dominate all of these other [NASA] missions. . . . We are not going to have magic money that is going to come from the Defense Department. We are not going to have magic money that is going to flow in from a bundle of revenues."

Brown, showing irritation, responded with a remarkable political analysis of anti-Space Station motivations:

Defense spending was removed from partisan controversy by last year's "budget summit" between Congress and the White House, Democrat Brown explained. In the absence of that political issue, he continued, "the Democrats in the Congress have chosen the next available target, which is the budget increases proposed by the Administration as investments in our future for research and development. . . . In effect," Brown said, "this arena has become a substitute for the debate over military spending.

"To oppose the Administration, "he continued, "Democrats have had to reverse their historic support for these long-term investments in the future of the nation. It was Democrats who created the space program and who developed the Apollo program without, may I say so, either scientific support or scientific justification," Brown said. "And now it is the Democrats who are turning against it, primarily because it is now the only available arena in which we can confront a Republican President.

"Now, I do not choose to follow that course," Brown declared. Instead, he said, "I suggest that the Budget Committee look at the billions of dollars in cost overruns for Medicaid, for example."

"George," Panetta said with exasperation, "with all due respect, you sound like one of those Rotary Club members, you know, that you hear this argument from when you talk about budget choices."

Brown responded that NASA has developed a "balanced" program that was feasible with projected growth rates.

Panetta replied: "Now, I just get a little bit concerned that enough is never enough and that choices are not going to get made. And, damn it, NASA is going to have to make choices, just like we have to make choices on housing, just like we have to make choices in education. . . . They are not going to be able to have everything funded. They are not. They are just not," Panetta repeated.

Tauntingly, Brown reminded Panetta that the House recently voted to save the Space Station after the Appropriations Committee sliced it out of the NASA budget for next year [SGR June 15: "How They Salvaged the Space Station on Capitol Hill"].

"Mr. Chairman," Brown said, "I have to tell you that the votes of the House indicate that both the Appropriations Committee and maybe the Budget Committee did not properly reflect the views of the House on this particular issue."

Brown and Hall were followed to the witness table by NASA's J.R. Thompson, who looks and sounds like a bouncer. Thompson, a veteran of 20 years with NASA, confidently assured the Budget Task Force that "almost 40 percent of NASA's budget is dedicated to science. Science is what NASA is all about," Thompson asserted, adding that

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Independently published by Science & Government Report, Inc., twice monthly, except once each in January, July, August, and September. Annual subscriptions: Institutions, $325.00 (two years, $555.00). Bulk and individual rates upon request. Editorial offices at 3736 Kanawha St. NW, Washington, DC 20015. Tel. (202) 244-4135. For subscription service: PO Box 6226A, Washington, DC 20015. Tel. 1-800-522-1970; in Washington, DC 785-5054. Reproduction without permission is prohibited. SGR is available on University Microfilms International. Claims for missing back issues will be filled without charge if made within six weeks of publication date. ISSN 0048-9581.

. . . "Not Going to Turn NASA Over to Scientists"

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NASA supports 4000 research grants in some 365 universities.

Chairman Durbin observed that the initial plans for the Space Station had been severely reduced, causing many scientists to complain that it could not serve their research needs.

"We have adjusted," Thompson conceded, quickly adding, "NASA is in love with what it has got, and it never relooks at anything." Balance is the goal, he insisted, but balance was threatened by the House Appropriations Committee's vote to terminate the Space Station. Do not fault NASA for lack of balance, he urged.

Panetta, referring to the formula that saved the Space Station in a vote on the House floor, responded: "Is it balanced in your mind when we cut $1.4 billion out of the other programs in order to fund the Space Station? That is balance for you?"

Thompson countered, "When it came out of the [Appropriations] Committee, zero for the Space Station—was that balanced?"

Panetta: I don't understand what the hell your definition is of balanced. I mean, something is going to get cut . . . and from what I see, Space Station is going to prevail, and the other missions are going to get cut.

Thompson: I don't know . . . NASA has proposed, the Administration proposed, and now Congress has to appropriate.

After scoffing at Chairman Panetta's assertion that "science is going to get screwed," Thompson addressed the opposition to the Space Station recently expressed by scientific societies. Stating that "I believe there was a lot of parochialism in there," Thompson said, "We get the same stuff internal from NASA, from our rocket types, you know, making the case."

At NASA, Thompson confidently assured the Task Force, "science has been treated right," and the scientists "know it better than I do. But we are not going to turn all of NASA over to the scientists. That ain't going to happen," Thompson assured his listeners.

Chairman Durbin softly responded: "I am not sure they are asking for that," and thanked Thompson for testifying.

The next to testify was Nobel Laureate Arno Penzias, Vice President of Research, AT&T Bell Laboratories, who ridiculed claims of commercially valuable spinoffs from the space program. True, he said, "the astronauts not only used heart monitors, computers, telemetry equipment, they also drank Tang and, as far as I know, broiled their toothpaste tubes of whatever they were eating on Corningware. But none of those things were invented in the space program," Penzias said.

He added, "I went to some great lengths with some correspondence with some folks at NASA to try to nail down items which actually came from the space program of lasting technological value. The only one I am aware of," he said, "is the explosive welding of aluminum."

A fellow witness, Thomas Donahue, Professor of Planetary Science at the University of Michigan, said that through many years of involvement in the space program, "I have never found an example of spinoff." He allowed that NASA has "tended to push technology and use it," and credited the space agency with "popularizing Velcro."

Asked by Durbin about growing crystals in space for research, Penzias said, "The modern studies of proteins no longer need to grow them in crystals. We are now at a point where we can deal with individual molecules. We don't need the bulk business anymore."

Another witness, John Pike, the widely quoted space specialist at the Federation of American Scientists, supported the Task Force's fiscal fears with assurances that "there is no reason to believe that EOS [Earth Observation System] is going to escape from the iron law of the space program that costs always escalate."

Expanding on that theme, Donahue said that it has been a practice of NASA and the Pentagon "to 'low ball' and buy in a new start on a mission with the expectation that the costs will actually go far beyond those of the original estimate." When deficit-reduction pressures thwarted these tactics, Donahue said, underfunding contributed to the failures in the Hubble telescope optics and the Galileo antenna deployment.

Next up was the SSC, with David Nelson, Executive Director of the Department of Energy Office of Energy Research, in the witness chair. Nelson recited current budget data for the project: total cost, $8.249 billion in "as-spent funds," of which $2.7 billion is to be in non-federal funds. Of the latter amount, Texas, site of the SSC, has pledged $875 in direct contributions to the project, plus $125 million in other support. DOE says it hopes to get the balance, $1.7 billion, from foreign collaborators, though nothing has materialized from abroad after several years of optimistic reports from DOE.

Chairman Durbin noted that Fred Bucy, former President of Texas Instruments, had expressed doubts about Japanese and European support when he recently resigned as head of the Texas SSC Commission. Durbin added that Bucy had said he would devote himself to persuading Congress to finance the venture without foreign help. And Durbin expressed puzzlement that DOE was now seeking SSC support from the Soviet Union, at a time when the Soviets are "begging for dollars."

Acknowledging that DOE is "disappointed" by the lack of foreign response, Nelson said, "Mr. Bucy is entitled to his opinion, but in the opinion of the Department, the day is still early. It is not late. . . . We have a couple of years before things can be considered in any way a crisis." Regarding the Soviets, he said, "We don't expect monetary assistance. We

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. . . SSC's Elusive Foreign Support Draws Skepticism

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expect assistance in kind."

Meeting the budget requirements of the SSC, Nelson said, will eventually require "belt-tightening," but so far the project has not impinged on other government basic-science programs. NSF, he pointed out, is budgeted for a 15 percent increase, NIH for 7 percent, "and even within the Office of Energy Research, which you might think would be hurt, if anybody, we are at 3.9 percent—in other words, holding even with inflation, outside of the SSC."

But without foreign contributions, Chairman Durbin said, the SSC will require about $1.7 billion more in US funds than are now planned for. "Where would the money come from?" he asked, leading to a hard-edged exchange between the Chairman and the DOE witness.

Nelson: I think you have just given the best motivation for us to continue working for those foreign contributions.

Durbin: Well, we want you to be motivated.

Nelson: We are.

Durbin: We also want results.

Nelson: Thank you.

Before dismissing Nelson from the witness chair, Durbin said, "But it does strike me as rather curious that we are embarking on this with the promise of foreign funds, and as yet we can't point to one single pledge beyond . . . $50 million from India . . . Those of us who have to come up with the dollars through the budget and appropriations process are, I guess, a little curious, maybe even skeptical, as to whether or not this foreign source will be forthcoming."

Further skepticism about the SSC and big science, in general, was expressed by the next witnesses, Robert Richardson, Professor of Physics at Cornell, and Philip Anderson, Nobel laureate Professor of Physics at Princeton.

Citing the medical wonders of magnetic resonance imaging (MRI), Richardson declared, "This great advance has been claimed by the lobbyists of big-science projects as a spinoff. I have colleagues in Southern California," he said, "that have contacted me in E-mail with quotations of how the manned space program led to that as a spinoff. And also people in the SSC have said this is a spinoff.

"Nothing could be further from the truth," Richardson asserted. "The research that led to MRI came from lots of small grants and lots of different research areas and from a lot of different agencies: ONR, ARPA, NSF, NIH, DOE, and lots of others."

Deploring the "fallacy of the spinoff arguments used by large projects," Richardson said that MRI "was not a spinoff of any large project whatsoever." He added that he "conditionally" favors continued funding of the SSC, so long as small science is adequately supported, but he indicated he feared that runaway costs in the project might drain

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A Nobel Physicist's Harsh Assessment of the Super Collider

Excerpts from testimony July 11 by Philip W. Anderson, Nobel laureate Professor of Physics, Princeton University, to the House Budget Committee Task Force on Defense, Foreign Policy, and Space.

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Selling Big Science. "It is impossible to emphasize too much that the big science projects, because they are very expensive, allow you to employ public-relations experts. And the political pressure behind them builds up because, of course, they are employing very important contractors and they are representing a large amount of money spent in one Congressional district or another. The small science project has nobody in its favor except the future."

Destructive Effects of the SSC. "The SSC is also a disaster . . . for the education of young physicists, concentrating enormous numbers of them in giant groups away from the intellectual climate of their universities, doing tiny bits of projects which last three or four graduate student PhD thesis times. Even the theoretical students come out trained in esoteric branches of mathematics with no experience of actually thinking about experimental results. In other words, the people spinoff is getting less and less efficient, just as is the technical spinoff, as the projects get bigger and more narrowly focused on more and more practically irrelevant phenomena."

The High-Energy Bandwagon. "Particle physics is a narrow, inbred field, and it is easy for the particle physicists to create an external appearance of unanimity of goals. I do not believe that the community in its private thoughts necessarily believes that a crash program and a rapid program on the SSC is necessarily the best next step. I certainly can find people who will say they don't think so."

Big Science on Campus. "[T]here is a style of research that is characteristic certainly in physics and big science, and you can tell. [In] big science, you see your colleagues spend half a semester teaching and then they are off in some large institution working away . . . for the rest of the time. In small science, they are right there in the department all the time. You also see the style of these . . . very long projects, projects which make it difficult, for instance, in my own department to assess the value or the quality of young assistant professors in that field, because the assistant-professor time for bucking for tenure is six years, and six years is less than the time necessary for these results to come out."

. . . OSI Investigator Quits Baltimore, Gallo Cases

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gations Subcommittee.

Dingell, a longtime critic of NIH's management of scientific delinquency, explained that he had come around to the position that, at last, OSI was shaping up as a guardian of the taxpayers' investment in research. But, he said, Healy, in office since April, "has made a mockery of the OSI's alleged independence in dealing with misconduct allegations."

Healy conceded an initial bungling of the Cleveland Clinic case, involving a researcher who fudged data on a 1990 NIH grant application that she had approved. But she insisted that, at her initiative, the case was reopened when she had second thoughts. The final verdict at Cleveland, insufficient evidence to establish misconduct, was deemed unacceptable by OSI, which instituted an investigation not yet completed. Upon becoming NIH Director, Healy added, she had recused herself from any involvement in the Cleveland case.

Healy protested that these events back in Cleveland had nothing to do with her low opinion of OSI, shared by many in the scientific community. She left no doubt that she considers OSI a bumbling operation, weak on protecting the rights of the accused, and in a state of confusion about its own ground rules for investigating scientific misdeeds. OSI was also ineffective, she said, in preventing leaks of confidential documents about matters under investigation. Describing a meeting with the senior members of OSI's staff shortly after she became Director, Healy said she "listened in astonishment" as they argued among themselves over "which were the real policies and procedures" for conducting investigations.

In contrast to the many legislative lovefests that Healy has encountered in four months as head of NIH, the Dingell hearing—like all Dingell hearings—was a grueling affair, conducted in a prosecutorial fashion. But as is customarily the case with Dingell productions, the staff had dug up volumes of material embarrassing to those in the witness chairs.

Healy did not dispute Dingell's assertions that she had characterized OSI as "Keystone Kops" or that she had said OSI was "running amok." To preclude any suggestion of conflict of interest, she announced, she was recusing herself, not only from the Cleveland case, but from involvement in *all* OSI matters until the pending Cleveland case is settled.

The NIH Director's account was delivered with passion and indignation at insinuations of questionable acts on her part. Questioned about signing the flawed grant application at the Cleveland Clinic, she said that she did so in the belief that it was accurate, that she had routinely signed hundreds of applications, and that "to read anything into that is preposterous." She added, "Science proceeds because we have faith in each other."

Nonetheless, the evidence before the Subcommittee was, at least, unsettling. Healy was accused of humiliating into resignation Suzanne Hadley, OSI's former Acting and Deputy Director, who served as chief investigator in OSI's two most celebrated cases, those involving Nobelist David Baltimore, President of Rockefeller University, and NIH's own Robert C. Gallo, of AIDS-research renown.

Hadley, as it turned out, was also head of the OSI investigation that criticized Healy and the Cleveland Clinic for their handling of the fudged grant application. But Hadley stressed that her decision to leave OSI preceded Healy's arrival as Director and that the Cleveland Clinic

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Big Science

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funds from small science and leave the SSC inadequately funded and prone to technical failure.

Anderson of Princeton came on even stronger against the SSC, arguing that the project's budget was far bigger than its "intellectual importance." Worthy research is being neglected while the SSC is "relatively liberally" funded, Anderson said. Despite this, he said, elementary particle physics "has for the moment wound itself down," while "exciting things are happening" in high-temperature superconductivity, hydrodynamics, and interactions between physics and biology.

But these fields, he continued, are underfinanced because "The American funding system is low on what you might call 'risk capital.' It is set up in such a way that it goes on funding whatever was funded in the past: institutional rigidity is the name of the game."

Anderson praised the professional abilities of the SSC's managers. "But," he said, "as the message about the SSC gets diluted in the Department of Energy and in the political rhetoric, one finds false claims that particle physics did everything from MRI and the computer revolution to the television screen and sliced bread.

"To me," he said, "the saddest sight of all is to see officials of the Department responsible for our energy supply deliberately misleading Congress and the public with these false claims, and to see my particle physics colleagues, many of whom I admire and respect, sitting by and acquiescing in such claims."

As the hearing drew to a close, Chairman Durbin provided a political explanation for the SSC's survival in a harsh budget climate. Noting that the managers of the project have awarded some 8500 contracts in 40 states, Durbin said, "Now politically, I could tell you what that buys. It buys a lot of votes. . . . People from all over the nation start saying: 'I know the Supercollider is in Texas, but there is a piece of it in Illinois and there is a piece of it in Arkansas, and it helps.' "

. . . "Anticipatory" Data Included in Grant Application

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case had no role in that decision. The friction between Hadley and the new NIH Director occurred at a time when Hadley had moved on to another assignment at NIH but, under an agreement with OSI Director Jules Hallum, had agreed to work parttime on the Gallo and Baltimore cases until the final reports were completed.

Nonetheless, the Dingell Subcommittee seemed entranced by the Cleveland Clinic case and much of the hearing was devoted to combing over its details. The hearing brought out that Hadley was particularly critical of the Cleveland Clinic for including on its inquiry panel a scientist who was listed as a co-investigator on the grant application that was in question. NIH Director Healy said she picked that scientist because of his competence in molecular biology, but she conceded to the Subcommittee that it would have been preferable to exclude him.

Cleveland's initial inquiry, chaired by Healy, concluded that the accused had engaged in "anticipatory writing" in composing his grant application. Extensive questioning by Subcommittee members and staff brought out that this is not a recognized term in scientific discourse. It apparently was used in a circumstance in which data were not in hand but were confidently expected to arrive after the application was sent off. Nonetheless, the first inquiry, chaired by Healy, found no fault.

In his introductory remarks, Dingell said that Director Healy had ordered investigator Hadley to "rewrite the Gallo report because she felt 'it read like a novel.' " Also, that when Hadley refused, Healy accused her, among other things, of having developed a close relationship to Margot O'Toole, the so-called whistle-blower in the Baltimore case.

Dingell continued: "Dr. Healy then ordered that Dr. Hadley should be 'reined in,' and directed that Dr. Hadley make no more decisions on the Gallo and Baltimore cases, and further directed that Dr. Hadley's files be immediately removed from her office."

Testifying in a subdued and shaky voice, Hadley said she dropped those tasks when NIH's chief lawyer, Robert B. Lanman, informed her that her telephone logs were to be examined as part of an investigation of her relations with O'Toole.

"My competence and integrity were impugned," Hadley said, adding that she regarded her "career prospects as much in doubt."

Director Healy and attorney Lanman said that Hadley was misinterpreting these events. Hadley was asked to return the Baltimore and Gallo files, they said, because they contained confidential material and her new office was not equipped for security. As for the telephone logs of conversations between Hadley and O'Toole, Lanman said they were sought because Director Healy had heard reports of a close relationship between the two.

From this, he explained, concerns arose about "a perception of a lack of objectivity." To prepare to deal with this charge, he said, it was decided to check the telephone logs. "I felt that an independent review of telephone notes would be a way of getting at the facts."

Dingell asked Lanman whether he had asked Hadley, "Are you and O'Toole buddies?"

Lanman said he had not, adding that he thought it would be sufficient to examine the logs and had not discussed the reasons for the examination with Hadley. In the end, though, OSI Director Hallum refused to give up the files that contained the notes.

Rep. Norman Lent (R-NY) asked the NIH lawyer whether Director Healy had hatched the idea to check the logs. Lanman replied, "It was by mutual agreement" after he suggested to Healy that it would provide a way "of finding out the facts." Questioning never brought out whose idea it was.

William Raub, Deputy Director of NIH, chimed in to explain the genesis of Director Healy's interest in the logs of telephone conversations between Hadley and whistle-blower O'Toole. Explaining that he was "partly to blame," Raub said he had intended it as a "compliment to Hadley" when he spoke of her close relationship to O'Toole. What he meant, he said, was that Hadley had "gained O'Toole's cooperation." But looking back, he said, it seems that the statement was "cryptic," and subject to misinterpretation.

Assistant Secretary of Health James O. Mason played a minor part in the hearing, mainly confining himself to strong expressions of confidence in Healy's leadership. Addressing what he described as a suggestion from Dingell that Healy might be the "target" of an OSI investigation for her role in the inquiry at the Cleveland Clinic, Mason clearly indicated his disapproval of that possibility. Dingell responded, "I haven't suggested a damn thing. I have asked questions."

The hearing, which started at 9:35 a.m., was abruptly ended at 2 p.m. with Dingell's rap of the gavel right in the middle of a colloquy with Healy and Assistant Secretary Mason. Dingell hurried off, leaving staff members to explain that he had to attend another committee meeting. They expressed confidence that the Subcommittee would return to the subject of Healy and OSI. Meanwhile, Healy, surrounded by reporters, expressed indignation at the Subcommittee's line of questioning, and assured the press that she had no apologies to make.

Witnessing this spectacle, it was difficult to avoid the aroma of a cesspool of bureaucratic paranoia in Bethesda. Though Bernadine Healy has been head of NIH for only a few months, an increasingly heard speculation in Washington biomedical circles is that she and the office are not a happy match and that she's not destined for a long tour of duty. A deft administrator does not leave fingerprints in executing dire deeds.

As Talleyrand said of Napoleon' assassination of a royal heir: "This is worse than a crime. It's a mistake."—DSG

More In Print: R&D Collaboration, Hypersonic Flight

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ernmental forum to identify and debate" policy issues in sci-tech cooperation, study of "framework agreements" for international ties, and "more regular meetings" between US and foreign S&T officials. The Carnegie Commission, staked by the philanthropic Carnegie Corporation, has a blue-ribbon membership drawn from academe and industry, and is dedicated to kibitzing on science-policy issues.

Order from: Carnegie Commission on Science, Technology, and Government, 10 Waverly Place, New York, NY 10003; tel. 212/998-2150.

International R&D Cooperation: Lessons from the Intelligent Manufacturing Systems Proposal (40 pp., no charge), from the Manufacturing Forum, part of the National Academy of Sciences complex, Discussion Paper No. 2, a review of the wary US response to Japan's 1989 proposal for a $100-million-a-year decade of international collaboration on development and standardization of advanced manufacturing systems. The report is by George R. Heaton Jr., an attorney and Japanese-affairs specialist who holds an adjunct appointment at Worcester Polytechnic Institute. From initial fears of a "Trojan Horse," the US evolved toward a cooperative stance, Heaton says, in part because of recognition of "an unsettling reality: technology from abroad is at rough parity, in quantity and quality, with what originates at home." Also available from the Forum, Paper No. 1, issued in May: ***Toward a US Technology Strategy: Enhancing Manufacturing Competitiveness***, by Erich Bloch, former NSF Director.

Order from: National Academy of Sciences, Manufacturing Forum, NAS 301A, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-1579.

Publications of the National Science Foundation (NSF 91-61; 34 pp., no charge), current through May 1991, lists hundreds of general publications produced by NSF and specialized reports from NSF's disciplinary directorates.

Order from: National Science Foundation, Forms and Publications, 1800 G St. NW, Washington, DC 20550; tel. 202/357-7861.

Subsurface Science Program (DOE/ER-0501T; 44 pp., no charge), from the Department of Energy, a review of the research programs it is supporting to clean up 40 years of dangerous contaminants that it and its predecessors have spread across the American landscape.

Order from: Subsurface Science Program (ER 74), Department of Energy, Washington, DC 20585, attn. Frank Wobber (include self-addressed label); no phone orders.

Intelligent Building Technology in Japan (NISTIR 4546; 59 pp., no charge), by Arthur Rubin, of the National Institute of Standards and Technology, a report on Japanese research on "intelligent buildings," traditionally defined as those employing computers and sensors to manage climate control, elevator operations, security, etc. The definition, Rubin says, now extends to features designed to "enrich and improve the total office environment." The report states that "The private sector in the United States has no comparable research capability to its Japanese counterpart."

Order from: National Institute of Standards and Technology, A-313 Building Research, Attn. Arthur Rubin, Gaithersburg, Md. 20899; tel. 301/975-6445.

Aerospace Plane Technology: Research and Development Efforts in Europe (GAO/NSIAD-91-194; 146 pp., no charge), by the General Accounting Office (GAO), says the US leads Europe in the development of hypersonic aerospace-plane technologies, because of the US X-30 National Aerospace Plane Program (NASP), a Pentagon-NASA enterprise that's expected to cost over $5 billion between 1986-97. The US could be challenged by Europe in collaboration with Japan and/or the Soviet Union, GAO says, but at present, France, the UK, and Germany are spending modestly on the necessary technologies. The report states that X-30 officials are cool to international collaboration. The possibility was considered by the National Space Council, the GAO reports, "but most council members believe NASP should remain a national program since aerospace technology is one of the few remaining areas in which the United States has a positive balance of trade. . . ."

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

SGR Summer Schedule

The next issue of *Science & Government Report* will be published September 15, 1991.

In Print: Biomedical Politics, Defense R&D Shifts, Etc.

The publications listed are obtainable as indicated—not from SGR.

Biomedical Politics (352 pp., $29.95, plus $3 shipping), a novel presentation from the Institute of Medicine, health-policy arm of the National Academy of Sciences: case studies of six public controversies arising from biomedical developments. The introductory material conveys a hint of a desire to tutor the masses to recognize the wisdom of science and get out of the way. But the case reports are informative and generally well-written accounts of complex issues. Topics and authors:

"Unproven AIDS Therapies: The Food and Drug Administration and ddI," by Jeffrey Levi, a health-policy consultant long involved with issues of AIDS and gay and lesbian rights.

"A Political History of RU-486," by R. Alta Charo, Assistant Professor of Law and Medical Ethics, University of Wisconsin Law and Medical Schools.

"The Human Genome Project: The Formation of Federal Policies in the United States, 1986-1990," by Robert Mullan Cook-Deegan, Director of Biobehavioral Sciences and Mental Disorders, IOM.

"Origins of the Medicare Kidney Disease Entitlement: The Social Security Amendments of 1972," by Richard A. Rettig, Director of the IOM study of the Medicare end-stage renal disease program.

"Deliberations of the Human Fetal Tissue Transplantation Research Panel," by James F. Childress, Professor of Religious Studies and Professor of Medical Education, University of Virginia.

"Asilomar and Recombinant DNA: The End of the Beginning," by Donald S. Fredrickson, former Director, NIH.

Order from: National Academy Press, 2101 Constitution Ave. NW, PO Box 285, Washington, DC 20418; tel. 1-800/624-6242; in Washington metropolitan area: 202/334-3313.

In Japan: Maruzen Co., Ltd., 3-10, Nihonbashi 2-Chome, Chuo-Ku, Tokyo, 103.

In Europe, Africa, and Middle East: John Wiley & Sons, Ltd., 1 Oldhands Way, Southern Cross Trading Estate, Bognor Regis, West Sussex PO22 9SA, England.

Redesigning Defense: Planning the Transition to the Future US Defense Industrial Base (GPO Stock No. 052-003-01249-9; 118 pp., $5.50), from the Congressional Office of Technology Assessment (OTA), a study focused on the sustenance of military research and innovation when Congress and the White House have agreed to reduce defense spending to 3.8 percent of GNP by 1996—a bit over half the 1985 level. OTA smiles on favoring R&D over production, stressing, however, support for "a broadened approach to R&D that includes improvements in manufacturing or 'process' technologies as an important goal."

Also from OTA: ***Technology Against Terrorism: The Federal Effort*** (GPO Stock No. 052-003-01246-4; 106 pp., $5), an expanded, unclassified version of a 16-page summary OTA released last February on anti-terrorism high-tech research by US agencies, 20 of which, OTA says, spend a total of $70 million in this area [SGR, March 1]. The main topic is detection of explosives, particularly on aircraft. The report says R&D support has been declining and is inadequate relative to threats and technical opportunities. OTA also reports that inter-agency orchestration is weak and jurisdictional strife is plentiful.

Order from: USGPO, Superintendent of Documents, Washington, DC 20402-9325; tel. 202/783-3238.

Large Non-Defense R&D Projects in the Budget: 1980-1996 (55 pp., no charge), by the Congressional Budget Office (CBO), another look at a favorite Congressional topic: whether a disproportionate share of federal R&D money is consumed by mega-projects, such as the SSC, space station, etc., to the detriment of "little science." Noting that there are no accepted rules for how much is too much, the CBO (which serves as budget analyst for the whole Congress) says the big-project share of R&D rose from 10 percent in the mid-1980s to 15 percent last year, and appears bound for 22 percent by 1996. In contrast to past surges in mega-spending, CBO notes, the current growth is accompanied by White House designs to protect small science programs in NASA and DOE, but the report cites doubts that funding can keep pace with big-science costs. The report tepidly discusses creation of a Congressional "cross-cutting review" of federal R&D programs to extract a big picture from fragmented committee jurisidictions. But that idea has broad support except where it counts, i.e., among the Congressional chairmen who fear that overviews might be a first step toward clipping their power. The report was writtem by CBO staffers David Moore and Philip Webre under the supervision of Elliot Schwartz.

Order from: Congressional Budget Office, Publications, 2d and D Sts. SW, Washington, DC 20515; tel. 202/226-2809.

The United States as a Partner in Scientific and Technological Cooperation: Some Perspectives from Across the Atlantic (94 pp., no charge), from the Carnegie Commission on Science, Technology, and Government, an assessment of the shaky place of international collaboration in American research priorities, written by Alexander Keynan, Professor of Microbiology at Hebrew University. Keynan, who has extensive experience in international scientific affairs, notes America's reputation "as an unreliable partner in S&T cooperation," attributing it to a long run of self-sufficiency in R&D compounded by a diversity of science-support agencies and the uncertainties of the annual budget derby. Proposed remedies include creation of "a non-gov-

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